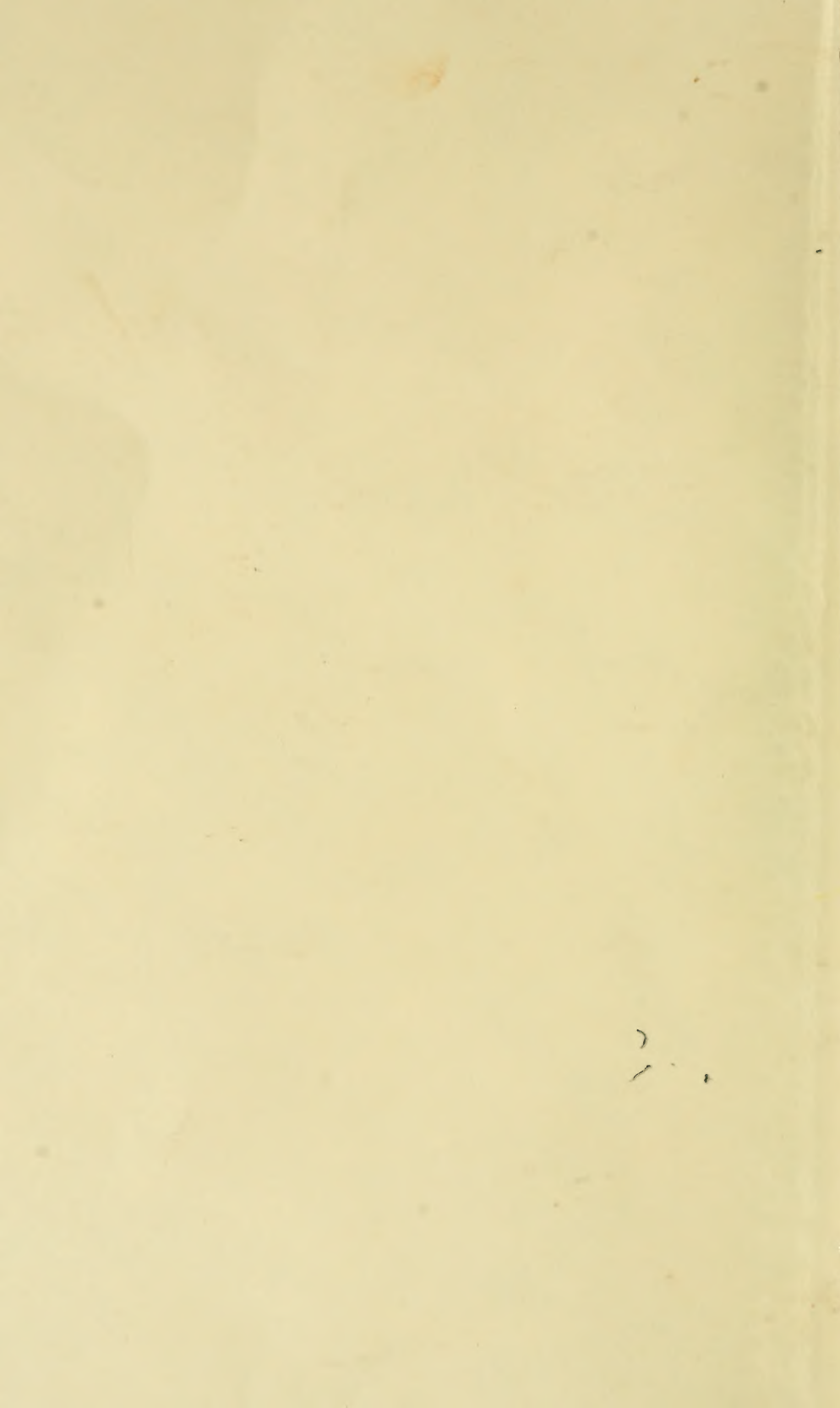


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ADDRESS

OF

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BENJAMIN HALLOWELL,
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(OF ALEXANDRIA, VIRGINIA,)

AT THE MEETING OF THE

AGRICULTURAL SOCIETY OF MONTGOMERY COUNTY, MD.,

14 /
HELD AT

ROCKVILLE, MONTGOMERY CO., SEPTEMBER 9, 1852.

PUBLISHED BY THE REQUEST OF THE SOCIETY.



3 WASHINGTON:
PRINTED AT THE CONGRESSIONAL GLOBE OFFICE.
1852.

AGRICULTURAL SOCIETY OF MONTGOMERY COUNTY, MD.

At a meeting of the above Society at Rockville, on Thursday, September 9, 1852—

On motion of A. BOWIE DAVIS, Esq., it was unanimously

Resolved, That the thanks of the Society be presented to BENJAMIN HALLOWELL for the able, eloquent, and instructive address which he has just delivered, and that he be requested to write it out for publication by the Society.

ROCKLAND, 9th month 13th, 1852.

ESTEEMED FRIENDS: I have endeavored to comply with the request you made to me personally, as well as the very flattering resolution of the Society, to write out my address at Rockville on the 9th instant, which I herewith forward to you. It will be found, I think, that I have embodied the substance of my remarks. Some things which I

said may have escaped my recollection, and, in a few instances, the ideas may possibly be a little extended. I spoke from very brief notes, having the subject-matter only before me, and this being the first time I have ever undertaken to report my remarks, I have found it a much more difficult task to reëmbodify my ideas in language than I had contemplated, and I have certainly been less successful than *I thought* I was under the inspiring influences of the bright faces around me. I have done my best, however, in the very limited time I have had to devote to the subject; and if what I have done shall only prove satisfactory to you and to the other members of the Society, it is all I desire. Your sincere friend,

BENJAMIN HALLOWELL.

TO ROBERT P. DUNLOP, FRANCIS P. BLAIR, A.
BOWIE DAVIS.

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ADDRESS.

Worthy President, Members of the Agricultural Society of Montgomery county, Ladies and Gentlemen:

Six years ago, at the first meeting of the citizens of the county on an occasion similar to the present, I had the honor to address you, and I have been led to contrast the present exhibition with the one we that day witnessed. The comparison is very favorable to the progress of agriculture in our county, and speaks well for the industry and enterprise of its citizens. Upon the occurrence of the still deeply lamented death of the first president of the Society, (the late John P. C. Peter,) whose zeal and activity, connected with his practical example, did so much to arouse the dormant energies, and induce a united effort to advance the agricultural interests of our county, among other causes of heartfelt grief for the loss we had sustained, all naturally felt an apprehension for the fate of this Society; but it continued to exist and to prosper—no doubt less than it would have done, but for this afflicting dispensation; but still it prospered. So, when one year ago, its late worthy president (A. Bowie Davis, Esq.) announced his determination to resign the office he had filled with so much credit to himself, and such great benefit to the Society, strong apprehensions were again felt, lest the interests of the Association would materially suffer. But what do we now see? Under the present efficient president, the Society gives evidence of *greater prosperity than ever before*; and I am led to infer, that its success is less due to the efforts of its presiding officer—useful and laudable as they may be—than to the growing energy and spirit, and increasing industry and zeal of the people—the masses—in this occupation of occupations—farming—the highest, the noblest that man can engage in.

In order to obtain some notion of the high rank of farming among the business callings of men, let it be remembered that every animal on our globe, man included, is dependent for existence on the produce of the earth, either by feeding upon this produce immediately, or upon those animals that have been supported by it. Hence, as the fertility of the earth is increased by the farmer, and food

rendered more abundant, animals multiply, and happiness is augmented, for “wherever there is life, there is enjoyment.” The farmer thus comes, in measure, to coöperate with Deity in the diffusion of life and happiness around him, and he feels the noble dignity of his profession, and the felicity resulting from a conscious effort to perform a useful part in the sphere in which Providence has placed him.

I have been to-day more impressed than ever before, with the advantages of such gatherings as the present. To see the venerable gentlemen near me,* who, in all probability, but for this Society, would have descended to their graves without having again the pleasure of beholding the smiles of each other's countenances, cordially shaking hands, with hearty congratulations for continued health and activity; and then the continual meeting of acquaintances who have not seen each other since our last year's gathering, and would not now have had that pleasure but for this Association, and the pleasant faces of old and young, indices of the joyous hearts within, and evidences that this is truly a *jubilee* to the citizens of Montgomery county, all this cannot fail to impress one deeply with feelings in favor of the source of so much manifest enjoyment. I have been, too, most highly delighted in witnessing the products of industry on exhibition, very especially with the contents of yonder tents, the ladies' department. The ladies, decidedly, carry off the palm to-day, and if a premium is awarded for the comparative merits of sustaining this Association, the ladies are indisputably entitled to it. What have the men been about? I have been unable to find any varieties of wheat, oats, grass, only one specimen of corn, and that from my own farm, very few hogs. Why have not more stock and farming utensils been brought? One gentleman of the county has, since last year, made a most ingenious and valuable improvement in an important agricultural implement, which, from all I have heard of its import-

* Major Peter, G. W. P. Custis, and Roger Brooke were on the stand by the speaker.

ance, I wished to recommend to your attention; and on asking him where I should find it in the collection, he said, "I really forgot to bring it." I am glad to say better things of the ladies. Their part is well performed. The specimens, and variety of specimens, too, of choicest bread, butter, preserves, such blankets, quilts, ottomans, &c., &c., &c., as are exhibited in those tents, it must delight every lover of his county to see. I have been reminded this morning by these interesting evidences of the ladies' industry, of a circumstance I have not thought of for a long time before. Some years ago I attended an agricultural exhibition for the State of New York, at Flushing, on Long Island. I was highly delighted to see such specimens of needle-work, both plain and ornamental, wearing apparel of different kinds, hats, bonnets, blankets, &c., &c., &c., as were on exhibition, with the name of Miss one and Miss another on the cards attached, and remarked to the gentleman who was with me, "such young ladies as these are certainly worth having; how will we get some of them our way?" "Send your sons on," replied an elderly matron who heard me in the crowd. I am proud to-day to be able to feel, that there is no occasion to take that advice—our sons might go further and do worse.

There is a great individual advantage, too, from these exhibitions, where we can compare our own products with those of our neighbors. I remember well, when, one year ago, the person who so satisfactorily manages my farm, proposed to bring a favorite ram which I have to the Fair; I was much pleased with the proposition, having no doubt whatever, not only from my own observation, but from the statements of others, that it was the best ram in the county, and that if there was a premium offered for such an animal, mine would certainly obtain it. Well, it was brought, and when I came to look it up in the collection, I found one belonging to my friend, Horatio Trundle, close by it, which, with all the natural prejudice in favor of my own, I had to acknowledge was worth twice as much as mine. I was astonished! I was mortified! not only at my want of success, but at my want of knowledge. I had possessed a poor sheep, and did not know it, thought it a good one, found I did not know what a good sheep was, and probably never would have known, but for this agricultural exhibition. But it did not discourage me. I only resolved to try the harder to improve my stock. On one thing I determined, however, that is, not to bring a sheep to the exhibition again with the expectation of its taking a premium, without previously making a visit to the fold of my friend Trundle.

In order to show that the cause of disappointment was not so much the condition of my sheep as that of the one with which it was compared, I may mention, that during the fall I had the pleasure of seeing a lot of sheep that were said to have taken the premium at the "World's Fair" at London; they were subsequently purchased by a young gentleman near Alexandria, (R. P. Dulany, Esq.,) and brought over to this country. They were fine sheep, very fine, but no one was equal to the one of Trundle's just referred to, exhibited here last year.

If we wish to have good stock, we must not only be careful in the selection of the breed, but we must raise good crops, that is, we must be good

farmers—treat the stock and the land liberally. In preparing for a crop, great care should be taken to have good and clean seed. Every farmer should save seed for himself. A little time spent in gathering from a field those stalks of corn that bear two or more large ears, and ripen early, or those heads of wheat that are long, well filled, and early matured, may be the means of adding much to the yield of the succeeding year. The grain that grows largest, and matures earliest, on any soil, is best adapted to that soil; hence, with a little trouble, in the manner just indicated, a farmer can obtain seed which is better adapted to his soil, than any he can obtain from abroad. In peas, cucumbers, &c., &c., the earliest sets should generally be kept for seed, and not appropriated, as is too often the case, for an early dish for the table. By foregoing an early dish this year, you may have several as early the next, and every year after. Those sets of a vine, as cucumbers, cymplings, and melons, should be left for seed, which grow on the main stem, not on the branches. So of plants that bear seed on branched tops, as the parsnips, &c., that seed only should be planted that grows on the main stalk. Seed should be large of its kind, smooth, plump, and fully ripe.

Before leaving the subject of the selection of seed, I may remark, that it is a question of interest, and one not yet fully decided, how smut is propagated. It is conceded that smut will not vegetate, but smutty seed wheat, even when the grains of smut are carefully separated, is very liable to produce a smutty crop. I would offer this suggestion: Smut seems to be the result of a defective vital power in the plant, in consequence of which an unhealthy or abnormal secretion takes place in those stalks, producing the form of a grain, but not possessed of nutrition or vitality. Now, while the deficiency of vital power in some stalks may be so great as thus to produce a growth entirely destitute of a power to vegetate, may it not vary in degree, and in other stalks produce grains with a vital power so weak, that although they will vegetate and produce a stalk, they will not possess the vital power necessary to mature the grain, and will hence form smut? From the best judgment my observation has thus far enabled me to form, smut is the result of deficient vital power in the seed, which will, of course, be rendered more perceptible when the same lot of seed is sown, in proportion as circumstances are less favorable to the growth of the crop: and thus it is impolitic to sow even apparently sound grains of a crop of wheat among which there has been much smut.

A seed, however be its form, essentially consists of cotyledon and heartlet, or germ, and is principally composed of starch and gluten. When placed in circumstances favorable to germination, as in warm, moist earth, it passes from a farinaceous to a saccharine state; the starch, which is insoluble, is, by a most interesting and mysterious natural process, converted into a kind of sugar which is soluble, and adapted to the support of the embryo plant. The larger and riper the grain, the greater will be the amount of starch it contains, the more saccharine matter it will afford the young plant, and consequently the more vigorous will be its growth. Hence arises the stronger growth of the Mediterranean wheat, and the propriety of removing the small grains from the ear of seed corn,—and the advantage that would arise, were

the practice general, of separating, by a sieve, the small grains, which are nearly as valuable as the large ones for bread, from seed wheat. *Ripe grain*, also, contains more starch than that cut earlier, and is hence better for seed. Wheat cut just as the grain is passing from the milky state, affords more gluten, the nutritive principle of wheat, and makes a better and whiter, though perhaps, to dyspeptics at least, a *less wholesome* bread.

Now, it is interesting to examine a little into the process which we call growth. Microscopic observation proves, that every germ is a *single cell*, of inconceivably small dimensions, endowed with that inscrutable power, denominated the Vital Principle. In the process of germination, a fluid matter, prepared in this cell by the agency of the vital principle, oozes through its sides, and forms another cell. Each additional cell performs a corresponding part in the wonderful process, and thus, from these multiplied, diminutive, and singly imperceptible cells, the plant is developed in accordance with the type of the species. In all this operation, that which nourishes the plant must be fluid, in order to admit of movement. Hence the necessity that the grain be placed in the ground at the proper depth. If not of sufficient depth, the heat of the sun will evaporate the watery part, and thus remove fluidity, and stop the circulation. To prevent this, is the object of covering corn and other grains. In a very wet time, they will grow and take root well, without any covering. On the other hand, if the grain is *too deep* in the ground, it does not receive the requisite amount of solar heat and air for healthy germination, or to sustain vigorous subsequent growth, and the *crown*—that is the part which forms the junction between the plumule and radicle—is too deeply immersed.

One advantage of the drill over other methods of putting in wheat is, that it affords a means of putting all the seed in at a proper depth. If a field of broadcast wheat be examined near harvest, a great number of half-grown stalks will generally be seen, which result from the seed being put in either *too deep* or *not deep enough*. In drilled wheat the number of these short stalks is much smaller.

The plumule and radicle, when developed, as just explained, immediately go in search of food for the growth of the young plant: the former into the air to abstract, by its leaves, from that element, carbonic acid, moisture, ammonia, and, perhaps, other volatile substances; the latter into the earth to take up, by the spongioles at the extremities of the roots, not only the soluble products of decomposed organic matter, but also mineral ingredients essential to the plant, as potash, lime, iron, silica, &c., all of which must be in a state of solution. Hence, we see that Nature works with two hands to supply the plant. If one is removed, the other must work the harder, and the plant, even then, will not be so well served. If the leaves are removed as soon as developed, as in pasturing close, the plant will not only thrive less, but the roots will draw harder on the soil, and the land be more rapidly impoverished. Pasturing is very injurious to young clover, and particularly to a young set, as in wheat stubble, and should, if possible, be always avoided. When the leaves are removed, new ones are developed at the expense of the root; the roots consequently become less extended, and enfeebled, and less able to endure the winter.

In connection with the leaves, we are able to discern that double purpose so frequently manifest upon examining the works of Nature, viz: utility and beauty. Who has not admired the beautiful foliage of the forest and shade-trees, and felt how much the leaves, by their poetic motion, shade, and softening reflection of the illuminating ray, increased the comfort of rural existence? But to reflect that, at the same time, beautiful as they are, they are as *useful* as they are beautiful, can scarcely fail to add to the pleasure with which we contemplate them.

Plants and trees take up their food at the *extremities* of their roots alone. Hence, in manuring a tree, it is useless to place the manure near the body of the tree; it should be placed over the extremities of the roots, the position of which can be nearly determined by the extremities of the overhanging branches, there being that wise and beneficent correspondence in the proportions of a tree, which enables the branches to intercept the falling shower and conduct it down over the extremities of the roots, where alone it can be serviceable in aiding nutrition.

Those who wish to water trees or plants successfully, must take a lesson from nature in this respect.

The distance to which roots extend, even in grasses and plants, is much greater than is generally supposed. My friend, Dr. Noble, of Philadelphia, and Judge Longstreth, of Pennsylvania, measured a clover root, which was over six feet in entire length, and descended fifty inches below the surface of the ground. John S. Skinner, whose name can never be pronounced by any one interested in agriculture, without feelings of grateful remembrance for his early, zealous, and long-continued labors in the cause, mentioned, in one of the Reports of the Patent Office, that he and two of his friends measured the lengths of the different roots of one hill of corn, and found the whole lengths taken together to be over eight thousand feet, or more than a mile and a half. When we reflect that these roots are all formed by the continued addition of those diminutive cells before alluded to, and grow in the short space of little over three months, we are made acquainted with some of the wonderful operations of nature particularly exposed to the farmer, and see the necessity of deep plowing, and a large supply of food in the soil for a large crop of corn. I will here mention a fact stated by Dr. Lee in the Patent Office Report for 1850-'51: In Kentucky, in 1850, on nine fields of 10 acres each, making 90 acres, were raised 10,960 bushels of corn, being an average of 121 bushels per acre. On two fields the average was 189 bushels per acre. Compare this with the yields of our best fields, and remember that this great produce results, not from climate, but *soil and culture*. Our soils must be made *richer*, and worked *better and deeper*, and there is nothing to prevent them from yielding as much. I was highly pleased with the remark of an intelligent Maryland gentleman some years ago, to one who was lamenting over the magnitude of the State debt. "Why," says he "there is wealth enough in the two inches below seven of the soil, to pay it all." This is a great truth, and if only *practically* believed by us, what advantages we would derive from it.

Plants, in their growth, absorb from the atmos-

phere carbonic acid, which they decompose, employing the carbon in their solid structure, and liberating pure oxygen to the air. Animals which are supported by these vegetables, reabsorb this oxygen, and return it to the air from the lungs in the form of carbonic acid. The atmosphere then imparts food to the vegetable, and receives the dead or waste matter of the animal, or, in the expressive language of Professor Draper, "the atmosphere is at once the grave of animal, and the cradle of vegetable existence."

This wonderful round of mutations is beautifully pictured by the poet:

"See dying vegetables life sustain,
See life dissolving vegetate again;
All forms that perish, other forms supply,
By turns we catch the vital spark and die."—Pope.

On the formation of this carbonic acid in the lungs depends, in a great measure, the warmth of the animal system. The first effort of nature is to maintain vitality. Hence, in cold weather, the first employment of the food is to preserve the necessary temperature of the system by converting the carbon into carbonic acid, thus liberating the latent caloric to warm the body. When the body is kept warm by artificial means much of the carbon so employed is converted into fat. Hence the importance of housing cattle. All know how greatly unprotected milch cows "fall off" in a cold spell of weather—the materials which should form milk being employed in the animal economy to preserve the necessary temperature; and it is equally, though not so perceptibly, a loss to stock cattle and working horses. Have a shelter, then, for all your cattle in winter; if of nothing else, one of pine bushes will well repay in the improved condition of the stock in the spring all the trouble of constructing it. Hence humanity is economy, and contributes to our temporal interest, as does the practice of every other virtue. Again, pigs should be allowed to resort to a wet place in hot weather to keep them cool, else they lose in perspiration a great amount of what would otherwise be converted into fat.

The food of all animals consists principally of carbon, hydrogen, oxygen, and nitrogen. The first three alone constitute fat, sugar, starch, and resin, and vegetable and animal products generally, while nitrogen is essential to the formation of all *cellular and muscular structure*. Hence, food that contains little or no nitrogen will form fat and warm the system but will not strengthen the muscles, nitrogen being necessary for this purpose. Grains used for food differ greatly in the amount of nitrogen they contain in proportion to their weight. Corn, for instance, contains less nitrogen than oats. Hence corn will fatten a horse faster than the same weight of oats, but the latter, by *nourishing his muscles*, will give him much more strength. The varieties of corn differ in this respect. The more flinty and oily produce more fat and are more heating and are better for fattening an animal or feeding to milch cows to produce butter, while other varieties support the system better under labor. Butter which contains no nitrogen but is composed entirely of carbon, hydrogen, and oxygen, while it produces warmth and fat, gives little or no support to the muscles, and is much less nutritious than the same weight of cheese. Animal fibre cannot be formed of butter or lard. This appears to be instinctively known to insects, which

deposit their ova on substances adapted to the support of their larva. We find worms in cheese, in buttermilk, in bacon, in apples, and in various other kinds of fruit, but never in butter, or lard, or tallow, because they contain no nitrogen, a material essential to the formation of all animal tissue. An apple or a potato gives more nourishment to the muscles, and is better to work on than butter. We find insects also guided by instinct in depositing their ova on trees. The common pines which contain comparatively little nitrogen are seldom injured by insects—locusts, whatever other trees they may injure, never injure the pine. With the exception of a single species of fly—called the wood-fly—it is not known that any insect deposits its ova upon it.

Trees are composed of root, trunk, and branches. The trunk of wood and bark. The wood is composed of *alburnum* or soft wood, *lignin* or heartwood, and the *medullar* or pith. The bark is composed of the liber or inner coat, the corticle, and the epidermis. The sap, holding in solution the materials necessary for the growth of the various parts of the tree, rises to the leaves, where it parts with a portion of the water, which served as a vehicle for its conveyance, and becomes *organized*, or converted into what is denominated the true sap. In effecting this organization, the cells of the leaf seem to act the part of a galvanic battery, excited to activity by the solar ray, which is essential to its efficient action. And here let me remark, that *solar light* is indispensable to vigorous animal or vegetable growth. Don't be afraid of sunshine. They who shut out the sunshine, exclude their best friend. Sunlight and fresh air are the true promoters of health. Children raised in cities, for want of sufficient light and exercise in the open air, as also good country food, seldom attain full size, so that it is very rare, indeed, to find a full grown person in large cities, unless he or his parents have been raised in the country or spent much time there. The race seems to deteriorate in crowded cities, both in size and longevity, especially among those who live with little bodily labor; so much so, that it is with me quite a matter of doubt whether, if the large cities were not continually replenished from the country, and those in the upper ranks were not constantly giving place in business to the descendants of the laboring part of the population, they would not become ultimately depopulated? I have been much pleased with the accounts we have of the amount of *exercise* taken by Queen Victoria *in the open air*, and which she imposes upon her children. She has laudably studied the laws of health, or else acts under the direction of some one who has, and no legacy she can bequeath her children will be of more value to them. It is said a late Minister to the Court of Great Britain (Andrew Stevenson) was, on a certain occasion, invited to take a morning airing on horseback with Her Majesty, and, strong and vigorous as he was, and accustomed to "going ahead," he yet found this lady going ahead of him, with her face ruddy from the keen morning air, till he was quite rejoiced when the termination of their journey relieved him from further fatigue. *Exercise, fresh air, and sunshine* are the great promoters of health, and are, *all*, indispensable to its full enjoyment.

To return. When the sap is organized in the leaves, it returns through the *most newly formed*

parts—the alburnum or outermost layer of wood, and the liber or innermost coat of the bark. That which descends through the alburnum forms a new alburnum and new liber, and converts the former alburnum into lignin or heartwood. This forms one of those concentric rings called a *growth* in trees, and by which the age of a tree may sometimes be determined when cut, one being formed every year. In an old tree, however, the first formed are greatly compressed, so as to be scarcely distinguishable. The sap that returns through the liber converts it into corticle, and then descends to nourish and extend the roots, so that they may reach new soil from which to derive their supply for the ensuing year. A soil thus becomes *gradually exhausted* of those elements which are adapted to the growth of a particular tree, so that it is always injudicious to plant a young tree where an old one of the same kind has died. We see, too, why, when a forest of oaks, &c., is removed, not oaks but pines will many times spring up in its place, the soil, though exhausted of the materials for nourishing oaks, still containing those required for the pines. The action of the pines and the elements, in disintegrating the soil, may prepare it again, and often does, for a new growth of oaks and other forest trees, on the removal of the pines. The same principle is applicable, and might be very advantageously extended more practically to the rotation of crops.

When the new corticle is formed as stated, the old corticle becomes epidermis, and the old epidermis scales off, as in the sycamore and nine-barks, or condenses in hard, rough crusts, as in the oak and hickory. When the epidermis fails to split, as occasionally happens in fruit trees, the tree ceases to thrive, and is said to be *bark-bound*. A vertical slit with a knife just through the epidermis, will often restore the tree thus affected, *entirely to health*.

It is the sap that returns from the leaves towards the roots through the liber that nourishes the fruit. As the fruit can take up a larger quantity, and, of course, be better nourished the more slowly the sap flows, the best fruit will generally be found on the *horizontal* branches, where the movement of the sap is not accelerated by gravitation. English gardeners on this account take great care in the horizontal training of the branches of their choicest fruit trees. The largest fruit of all will frequently be found on those branches that *hang down*, nature aiding them by their position to obtain more food from the sap that thus flows most slowly in opposition to gravity. The amount of sap that flows in any branch being limited, it is manifest that if there are more sets on that branch than this amount can nourish, all cannot mature and form perfect fruit. Some should therefore be timely removed. A little time and labor to this end are well repaid by the great superiority of the fruit that remains. It may be illustrated by attempting to raise twenty animals, as pigs, on food not more than sufficient for five.

As it is the sap which returns through the liber that both nourishes the fruit and extends the roots, the greater the growth of fruit, in any year, the less the extension of the roots to a new soil or source of supply, which is one cause of trees not bearing every year; or, if they do bear, the fruit being less perfect. So far as this cause exists, however, it may be greatly, if not completely reme-

died, by a plentiful application of suitable manures over the *extremities of the roots*, that is, *under the outer branches*, in the fall of the year, and then working it in, in the spring. In most cases, if the blossoms are not killed by frost, attention to this, and preventing the exhaustion of the limb by an over abundance of sets, will secure a crop of nice fruit every year.

There being a regular vascular connection between the leaves of a tree, and the roots, it is evident that each limb is supplied by its *own roots*, and it is a prevailing and hurtful error to suppose that when one limb of a tree is removed, the entire supply which that branch would have received will pass into the other branches. Orchards are, perhaps, in no way more injured than by injudicious trimming. The cutting off of a large limb is always of very doubtful propriety. The proper course is to give trees attention *when young*, and let no branches grow but those that are proper to remain. Neither should the limbs of the tree be removed so as to *expose the body of the tree too much to the direct action of the sun*. This checks the flow of the sap, retards the growth, and injures the tree.

The tender part of a tree is the *crown*, or the part where the trunk and roots join. An injury here, is fatal. If this part be covered, as is sometimes done, by throwing two furrows towards a row of trees in plowing an orchard, it will greatly injure, if not kill the tree. The earth should be kept level around the tree near the body, and not permitted to lie so that some roots are *too much exposed* to the sun, while others and the crown are buried *too deep*. When a furrow is thrown against a tree, the earth should afterwards be carefully drawn away. In replanting trees great care, on the same principle, should be taken not to plant them deeper than they originally were. If the crown be buried they *cannot live*. This is one great cause of disappointment in planting trees by inexperienced persons.

In budding a tree, the object to be aimed at is, to bring the *liber*, or innermost coat of the bark of the bud, in contact with the *alburnum*, or soft wood of the stalk. The sap of the alburnum of the stalk then nourishes this liber, and the liber nourishes the inserted bud, which develops in accordance with the vital principle and type of the original tree, and produces similar fruit.

In grafting, the object to be attained is, to have the *liber of the graft* in continuous connection with the *liber of the stock*. In grafting old stocks in which the bark is thick, while that of the graft to be inserted is thin, much care is required to have the *insides* of the bark, not the *outsides*, evenly adjusted.

The effect of a bud, or graft, placed on a stock, is to modify the sap, as it passes through its cells, by its inherent vitality, so as to cause it to assume a particular form of growth, and produce a certain kind of fruit, in accordance with the life and type of the original tree. Now, the vital principle which thus disposes the sap is a *power which originated from the seed which produced the first tree of this kind*; and the important question arises, is it, or is it not, a *power limited in duration*? That is, can we continue to propagate the same kind of fruit *perpetually* by grafting and budding? I think we cannot. Several kinds of fruits mentioned by English writers have already disappeared, and

some have "run out" in this country, and others are "running out." The first indication of a tendency to decline is an earlier ripening of the fruit, from a diminution of the peculiar vital power, so that winter apples that formerly kept till latter spring, become less enduring through the winter, or even to be a fall apple, and ripen earlier and earlier, till ultimately they will rot upon the trees, the vital power still being sufficient to impart the form, but not to mature the fruit.

These effects will first be perceptible in situations least favorably circumstanced for the fruit, and hence the same fruit may be propagated in some localities long after it has disappeared in others; but it must ultimately fail in all. All of our best fruits having originally been *seedlings*, I would query with our nursery men, whether sufficient care is taken to cultivate new varieties. If the position just stated is correct, and reason and experience unite in sustaining it, in the present system of budding all, it may frequently occur that a bud of an inferior fruit, and that of a kind near its extinction, may be placed on a stock which, if undisturbed, would produce a *new* variety of the very best quality, equal or superior to any that we now possess.

In getting stocks, too, especially of peaches, an erroneous custom prevails. On having some unusually luscious fruit handed it is not unusual to hear the remark, "You are welcome to the fruit, but I wish the stone saved to plant." Now this is the very kind of stone that should not be planted. Like flowers, which, as every one knows, may be cultivated till they cease to produce seed at all, the stamens being developed into petals, in such peaches the pulp is developed at the expense of the kernel, so that frequently, in eating the fruit, the parts of the stone will separate, and exhibit a small, shriveled seed.

Stocks from seed thus evidently deficient in vital power, and indeed from seed of grafted fruit generally, is, in my opinion, one cause of the great diminution in the length of life of the peach tree; and I think if our nursery men would procure stocks by planting the stones of the natural mountain peach from the western part of Loudon, the hardness and longevity of the peach would be greatly increased.

The principle just referred to, of a limit to the period in which the original vital principle will possess the power to organize and assimilate matter so as to produce a growth in accordance with a particular type, applies to all cases of propagation by cuttings, and, if correct, all our Lombardy poplars, which are propagated in that way, must at some time run out—sooner in less favorable situations, later in those that are more so. These things are mentioned more to invite attention than as ascertained facts, although my own mind is decidedly inclined to believe them correct.

This vital principle is most mysterious; what is it? We may take an organic substance, analyze it, and find exactly its elementary composition, and although these elements are in the greatest abundance around us, no art of the chemist can cause them to unite in the proportions in which they exist in animal and vegetable bodies. Nature, by means of the vital principle, operates alone in her grand laboratory, and leaves naught for us, but to admire her productions, and wonder at the means by which they are produced. With the

elements of food everywhere around him, man, with all his boasted attainments, and indeed all animals, would be necessarily starved, but for *vegetable life*, taking up those elements, and *organizing* them for his and their support. Let us look, then, with increased interest on the operations of the vegetable world, and on our occupation as farmers, which connects us so intimately with them.

That the vital principle is a power, we have evidence not only from its giving particular form to the materials, but also from its raising them in opposition to gravity. Look at the many tons of foliage of the forest, raised aloft by this power. How many tons, too, are raised by a few bushels of corn properly planted in a rich soil. It is a power, and that, too, of surpassing interest and wonder.

On the subject of the improving of land, I shall be able to say but little. "This is the first time I ever attempted to address an audience in the open air, and I find it more difficult than I had supposed, and am admonished of the necessity of abridging my remarks wherever I can do so in justice to my subject; and so much has latterly been printed upon the mode of treating land, that you have the best advice in your libraries, if not in your heads, and I will therefore devote most of the time to subjects which, though not of less importance, may have claimed less of your attention.

The rules for the improvement of land are very few and simple. First, if the ground is wet, dry it. Wet land cannot produce good crops. As previously stated, the roots grow and extend by the continual oozing of fluid matter through the most recently formed cells; and if the watery part which holds the material for forming the sides of the cell in solution, cannot evaporate, which is the case in wet land, the root cannot grow and extend, to obtain a supply of food for the plants. Make the land dry. For this purpose *under* or *French* drains are very valuable. These should be made on the borders of the *fast land*; for it is from thence the springs issue which make the lower parts wet. A ditch of sufficient depth, cuts these off, and dries the land. In tight clay lands, I have found great advantage from numerous *surface* drains, so as to permit the water that falls to be readily conveyed from the fields by *different* channels, thereby not washing the land in gullies. These surface drains may be shallow, and, if properly constructed, need not interfere at all with the crop.

After the ground is dry, (never work it when wet,) have it plowed and worked *well*, and ultimately *deep*. The object of plowing is not merely to turn the land over—the grass side down—but it is to *break it up* and *pulverize* it. A clod is almost, if not wholly impervious to the roots of a plant, and holds, tightly locked up, all the organic and important mineral matter it may contain, and the crop has to obtain all its supply from that portion of the soil that is pulverized or disintegrated. In addition to this, when the earth is made fine and open, its *absorbing* power is greatly increased, so that, by what may be called its capillary attraction, it imbibes much more moisture, carbonic acid, ammonia, &c., to support the growing crop. Hence the great advantage of working corn and tobacco *frequently* to keep the land open and light, and enable it to absorb from the atmosphere those volatile materials that plants need for

their support. After a rain has made the surface partially smooth and tight, much benefit will be found to arise from as early a working as a due regard to the state of the ground, as respects dryness, will admit to restore the absorbing power. It is a very erroneous notion to suppose that corn is worked merely to kill grass and weeds, or prevent their growing. This is a matter of very small consideration compared with the benefit just referred to. Grass and weeds among corn give promise of a poor crop, not because of their growth, but because they give evidence that the land has not been timely and properly worked. I am of the opinion that on many lands drilled wheat could be worked to advantage in the spring by letting the teeth of the drill, or a machine constructed for the purpose, pass between the rows of wheat, affording great benefit to the growing crop, and preparing the ground nicely for the reception of clover-seed. I design trying the experiment, and will, if I live, let you know the result.

Lastly, be liberal to your lands in *manure*, and *labor*, and *clothing*. Do not begin to pasture too early in the spring, nor pasture too close in the fall. What is left on the ground this year will, to some extent, *double itself* next. We all know how a covering of snow, by its keeping the ground and roots warm, favors the wheat crop; so will a vegetable covering protect the grass roots, and cause them to put forth earlier and with much greater vigor in the spring. If the grass or weeds stand straight on the ground in the fall, it is better to roll it, or have it tangled by stock, so as to keep the cold wind from the ground about the roots. The new set of clover and other grasses on the stubble lands should, by no means, be pastured, except it be to let the stock on *when the ground is dry*, a little before winter, to tangle the growth for the additional protection of the ground, as before hinted.

From the protection it affords the land, manuring on the surface, especially of grass lands, and when the manure is long, is among the very best modes of applying it. There is perhaps no way in which manure does as much good as when hauled right from the stable and spread immediately on the land.

The maxims for a farmer should be, never mix quick limes with any *animal* manure, burn nothing that will rot,* and let nothing rot that will support animal life. Feeding anything to an animal, while it ministers to his enjoyment, wastes none of it. He has to give it off to the air or otherwise, and thus return to be again incorporated in the vegetable structure, every part but that small amount used in his growth. A fully grown animal, human, or other kind, gives off as much as he receives, and all is returned to the land and air *if proper care is exercised*. I was much pleased with the reference of Lord Palmerston, in a recent agricultural speech, to a definition of dirt, that "Dirt is a thing in a wrong place." In this sense, are our premises entirely clean?—the most tidy of us? I plead guilty for myself. We are importing guano, at great expense, from thousands of miles distance, and neglecting much of what contains the very same elements as guano at our very doors. I like *liberality*, but not *waste*.

While we purchase guano, and other manures which have done, and are doing so much for our worn out lands, let us neglect no domestic source of their improvement. Guano and crushed bones I have applied to my lands with great success and profit. Guano contains nearly every element needed by plants, and in a state in which these elements are readily assimilated, and may therefore justly be regarded as one of the most important fertilizers ever discovered. To secure its full, permanent effect to the land, it should always be well mixed at least forty-eight hours previous to its application with about one third its bulk of plaster, and then well incorporated with the earth as soon as practicable after being sown to prevent volatilization. For a summer crop, a corn, or tobacco crop especially, the guano should be plowed under.

You of this county have a most beautiful home. Nature has done much for you. "Your lines are fallen in pleasant places." I have traveled a good deal, and have been a close observer of the countries I have passed through, but I have seen no country that possesses more of the *susceptibilities* of beauty, than the county of Montgomery, taking it throughout. The surface rolling and undulating, without abrupt hills, well watered, springs bursting forth almost everywhere, so that each farmer has water for his stock throughout the year on his own grounds, with yet but little waste land, grape vines growing luxuriantly, and if not yet giving you "vine-covered hills," at least affording you vine-covered *hedge-rows*, and beautifully festooning them, and at the same time evidencing how admirably adapted is your soil to the culture of the grape. Majestic forests, in many parts fine mountain views, the noble Potomac for many miles washing one of its borders, and that great work of inland navigation, the Chesapeake and Ohio Canal, passing through the entire length of the county, ready to convey the produce of the contiguous farms cheaply to market, and to bring back guano, plaster, and other fertilizers, to maintain the fertility of the soil. The unsurpassed healthfulness of the climate, too, is to be regarded. A number of the citizens in the county not only arrive to the age of three score years and ten—the time allotted to man by the Psalmist—but they very often reach four score, and even four score years and ten. In proportion to the number of white inhabitants, there are believed to be more of advanced age in this county, than in almost any other portion of our country. Then, not among the least of its advantages, is its position. Immediately adjoining the District of Columbia, and every part within an easy half day's ride of the seat of the National Capital, not only affording means of ready intercourse with members of Congress, and other officers of our Government, but also with distinguished strangers, whom the capital of such a country as ours must necessarily more and more attract there. Then the many objects of great and increasing interest. I regret to say that Congress has lamentably ceased to be deserving of being reckoned among these. Some of my students, young men grown, a few years ago, when there was a difficulty in organizing the House of Representatives, in consequence of two sets of members being returned from the State of New Jersey, obtained my permission to visit Congress. On their return, I asked them how they had been

* The only exception is in case of containing pernicious seeds.

pleased. A shrewd young man from the upper part of this State, replied, speaking slowly, and shaking his head significantly, "I think Congress is a bad example for school boys." This is too true, and it is greatly to be regretted, and those engaged in the education of youth feel it particularly, that, in the violence and disorder, unbecoming language, and ungentlemanly treatment of each other, so bad an example is set to the youth of our nation. There are, however, many there worthy of being members of Congress in its best days, but they are in bad company, very bad. So we will pass on to the office of the Coast Survey, and of the manufacture of the standard weights and measures, under the superintendence of Professor A. D. Bache—a gentleman of untiring industry, great scientific attainments, and who has done and is doing, in the station he so worthily fills, an amount of good for commerce and for science, not to be reckoned in dollars and cents. A visit to this establishment will well pay. Then the Smithsonian Institution, that endowment of unexampled liberality, under the charge of Professor Henry, whose unrequited labors have done so much for the advancement of the cause of science in our country, and whose success in investigating the principles of electro-magnetism, is only equaled by his unpretending modesty. Will you permit a little digression?

In 1819, Professor Oersted, of Copenhagen, made the first practical experiment, showing a connection between electricity and magnetism. To his labors, those of Professor Faraday, of England, and Professor Henry, now of the Smithsonian Institution, succeeded, and by these gentlemen, and chiefly by Professor Henry, nearly every scientific principle was discovered that is used in the structure of the magnetic telegraph, that wonder of this wonderful age, by means of which a person in New York can ask a question of his friend in New Orleans, a distance of eighteen hundred miles, and receive an answer in ten minutes. While Professor Morse obtains the *pecuniary* reward from the telegraph, let us not withhold from Professor Henry the reward of keeping in grateful remembrance an appreciation of his invaluable labors. There is also the National Observatory, under the direction of Lieut. Mauray, whose qualifications for the office he holds could not well be surpassed; mild, affable, industrious, energetic, glad to receive or impart information. His labors, in the good they have effected, have already added to our national renown. But, my individual interest in these subjects has, perhaps, drawn me too far, in endeavoring to awaken a corresponding interest in your minds, that you may properly appreciate the advantages you possess by the location of your home. It may be argued that in my high appreciation of the advantages and beauty of this county I am prejudiced by *love of home*. I fully agree with the poet, that

"There is a land of every land the pride,
Beloved by Heaven o'er all the world beside,
Where brighter suns dispense *scener* light,
And *silder* moons emparadise the night.
There is a spot of earth supremely blest,
A dearer, sweeter spot than all the rest,
And that all find, howe'er their footsteps roam,
That land their country, and that spot their home."

Montgomery.

But in the sense in which the poet uses the term,

this is not my home. I was not born or raised in this county or in this State. Indeed, being here but two months in the year, it cannot fairly be called my home now, though I value *most highly* the cordiality with which I have been received by you as a citizen of the county, and I thank you, *heartily* thank you, for the honor conferred. I then can be considered to speak without prejudice; and I say *emphatically*, that I know no locality containing more of what an intelligent mind, fond of rural pursuits and beautiful scenery, connected with opportunities of congenial scientific and political intercourse, could wish, than is to be found here. As I said, nature has done much for you; what have you done for yourselves? Leaving out of view the unimproved condition of many of your fields, let me ask, *How are your roads*, and what are you doing for their improvement? The soil is remarkably adapted generally for good roads, and it is only for you to will it, in order to have them. It can easily be demonstrated, with mathematical certainty, that if the road tax which the citizens of the county have paid during the last ten years—I do not mean the tax in dollars and cents only, but in *labor, time, wear and tear of wagons and horses*, now entirely lost, not only to yourselves, but to the world—had been *judiciously* expended, you would now have good roads, and such as could be kept in order at very small expense ever after. In Massachusetts, where the roads are properly kept, they allow, in loading, a ton weight for every horse; a two horse load is two tons; four horse load four tons; and they travel with the load at the rate of two and a half to three miles per hour. Now, this is at least a *double* load for equally good teams on our roads. Then, fully half the time our teams and hands are employed in taking our crops to market, and other road hauling, is *lost*—is a *useless road tax*, which, if employed in the improvement of the roads, would, in a very few years, put them in nice order, in which state they could subsequently be kept at very small expense. This is a subject that I would earnestly recommend to the influential citizens of the county. With such roads as we now have, *we shut people out from us*. We positively put ourselves at double the distance, counting distance by the time and labor it would require to travel it, which is certainly the true way, from our neighbors, from market, from Washington, from every place, in fact, to which we wish to go. An improvement of the roads would do more to advance the interests of the county than all other things put together. With fine roads, so that members of Congress and other influential persons from the different parts of our country, when on a visit to the seat of Government, could take an easy and pleasant excursion into our county, at the rate of eight or ten miles an hour, as they do in New England, and let them see the beautiful scenery, fine forests, good water power, the capabilities of the soil, its great adaptation to the cultivation of the vine, and above all the unsurpassed healthfulness of the climate, and your lands will soon cease to be in market at even the double of their present prices.

If our roads are not improved now, there will be still less excuse for us than there has heretofore been; for so much of the work of the farmer, indeed, nearly all of the real hard work, being done by machinery, more time can be devoted to the

improvement of the roads. I have no doubt some of the aged gentlemen near me remember when the wheat was gathered by the sickle, and the hay collected by the hand-rake. The grain-cradle was a very great improvement over the sickle; and now the reaper, *Hussey's* reaper, leaves nothing more in this line to be desired. His mower, too, is, in execution, equal to the reaper. Then, the drill, the corn-sheller, the revolving hay-rake, and the hay-fork, as so efficiently improved by my ingenious friend and neighbor, Edward Stabler, of Sandy Spring, by which a ton of hay can be unloaded into the barn in five or six minutes—all these labor-performing machines executing nearly all the real hard work on a farm, and in so much less time, too, leave the farmer much more leisure for improving the grounds about his dwelling, cultivating his mind, *making better roads*, and maintaining social feelings and intercourse, to which good roads in a neighborhood so greatly contribute.

But I do not want our beautiful hills and valleys settled by persons from abroad. I wish our sons and our daughters to occupy and enjoy them. We must bring up our sons, not to be lawyers and doctors, but to be farmers; or even if they do study law or medicine, let them have some other business also, so that they may be able to make a living when everybody is in health and at peace, and it is *possible* the community might more generally be so. We must bring them up, too, with habits of economy. I was much pleased, a few years ago, with a remark of a young New England editor, in introducing himself to his patrons. He said he had a capital which he valued at \$30,000: ten thousand dollars in *industry*, ten thousand in *economy*, and ten thousand in *perseverance*. This is the capital with which we should set up our children on these surrounding hills. I would much rather one of my children should have such a capital to commence life with than \$30,000 in money. He would be more healthy, more useful, and consequently more happy, and at the close of his life, in all probability, richer.

To bring them up to economy, we must set them the example; but instead of this, the example too frequently set is one of idleness and luxury. If a neighbor is to dine with us, there must be a ham boiled, chickens cooked in one or two different ways, tarts and pies baked, custards prepared, ice-creams, floating islands, &c., &c., the superintendence of which occupies the ladies of the family till the dining-hour, which, possibly, will be *a little late*. Then your guest will eat so heartily of the rich fare, that after he has dined, instead of entertaining you, (the ladies I am speaking to,) he will have to leave you to smoke his cigar, *as a means of depletion*. Now, I would have you to be *kind* to him, and instead of all this preparation, give him *a bowl of bread and milk*. Milk is, to the animal system, like guano to the land. It contains every element needed. Let this *rich diet*, particularly not needed when spending a day without bodily activity, be left till work is to be done, or much exercise to be taken, and employ the time used in preparing it for your visitors in making ready an *intellectual entertainment*. Make your company so agreeable to them that they will not know, on leaving the table, on what they have dined, and the gentlemen with this light diet will not have to forego their pleasure by leaving your

society for a cigar, but they will be ready for social and intellectual enjoyment. I am perfectly convinced that if *more attention* were given to provide an entertainment for the *intellect*, and less for the *stomach*, it would contribute greatly to both health and prosperity, and cause many young persons to marry, and settle the unemployed lands around us, who are now deterred by the prevailing extravagancies of living.

Economy and industry should go hand in hand. When I get into *supreme command*, I shall let no young lady get married who cannot make good bread, work and salt butter, and have it good, and in fact do all kinds of housework, raise good garden vegetables, and propagate and cultivate flowers. You may reply that *ladies in cities* have no need to learn garden operations. But, *in the contingency just stated*, there will be no cities, at least, none such as are now built; they are an unhealthy and an unnatural condition of the human family, "sores on the body-politic,"—they have a very pernicious effect upon the rural districts, draining them of so much of their enterprise. I would send them to the country to improve their manners and increase their health and enjoyment; and what sinks of corruption would be broken up. I should let no house be built without at least from five to ten acres of ground attached, for ornamental grounds in which to promenade, a vegetable garden, a flower garden, and, not the least, a *fine green plot for the children to romp on* in the fresh air and intermingled sunshine and shade as the solar rays passed through the waving branches above them. Then their ruddy cheeks would glow with health, their constitutions would be vigorous, and they would be able to enjoy life subsequently, and be prepared to transmit strong constitutions to their posterity. Just imagine the condition of this State, if Baltimore, Washington, Georgetown, Frederick, &c., were thus scattered over it, and the immense sums which are now employed irrationally in crowding a great, high, and still concealed palace, tight among a cluster of others, to be the prison-home of half a dozen weak and pale inhabitants, were devoted to erecting sensible and tasteful dwellings on these beautiful hills, and improving and ornamenting the grounds adjacent. What a paradise it might be. Then, not only good common roads but *railroads* and telegraph wires would traverse the State in every direction, so that business could be transacted with nearly or quite as much readiness as it can be done in cities as at present built. No, gentlemen and ladies, when I get into *supreme command*, there shall be no cities such as we have at present. Certainly, all necessary and proper business of commerce and manufactures can be conducted without so great a sacrifice of health, happiness, and comfort, and *consequently* of morals. And no lady shall get married who cannot do all kinds of housework, grow all kinds of garden vegetables, and cultivate flowers. I should not insist on her always doing the work with her own hands, but she should know *how* to do it, so as to direct and superintend operations, and then she would be certain to become so interested that she would be unable to keep her own hands from being occasionally occupied, and thus not only secure superior vegetables for the table, but from the exercise in the light and fresh air have more vigorous health to enjoy them. But having thus announced my "platform," fortunately for your

present customs, more perhaps than for your health and enjoyment, I shall not be likely to be installed into power.

I think it right to state in this connection, that I have been greatly interested indeed, in examining the contents of yonder tents, to see the choice bread, butter, preserves, &c., &c., but, ladies, did the *mothers* or the *daughters* make them? that is the question I would like to have answered. I am sometimes apprehensive, but possibly this is one of the effects of advancing years, that mothers are more fearful than they used to be lest their daughters injure themselves at employment. Do'n't, I beseech you, favor them to their hurt. Let them learn to do every kind of work; let them take plenty of exercise in the open air, and their constitutions will become strong and vigorous, and unborn generations will have great cause to bless you.

I will say, too, to the young ladies, that I have one favor to ask of *them* as a return for my attempt to interest and entertain them: that is, if they ever do happen to let a thought enter their minds about getting married, that they immediately and invariably associate with that thought these questions: can I make good, wholesome bread, good butter, good soup; can I do all kinds of cooking, and house work, and plain sewing; do I know how to raise vegetables of all kinds needed for the table, how to save the best seed, and how to cultivate flowers. If she can answer all these questions to herself in the affirmative, I wish her to understand that she has my full consent to get married. With such a companion, her husband would be none the less able to make a living, let his circumstances be what they may; on the contrary, he will be more able. Such a wife would be truly a great treasure. If she cannot answer them all in the affirmative, my advice to her is, to be able to do so in as short a time as possible.

That I may aid a little to this end, I will give you a few useful hints. I am speaking to the young ladies. In the first place, every family should make their own soap, at least all for ordinary purposes. Economy requires it, and the means of doing so are within the easy reach of every family, and liable to be in great measure wasted if not so employed. It is, besides, a scientific and interesting operation. Time will allow me only to give you a few brief hints which are requisite to secure success. The principal cause of the failure of this operation, arises from want of sufficient care in the ashes.

Ashes from leaves or twigs and small branches contain much more alkali, and are much better for making soap, than those from large limbs, or the body of a tree. Pine wood affords very little pot-ash, and its ashes should not generally be preserved for soap-making. Care should be taken, too, in order to prevent disappointment in the process, always to have the ashes *well burnt*, that is, by a hot fire, and with a free draft of air, before they are placed in the ash-pit. The alkali of the ashes which collect in an "air-tight stove," and indeed in stoves generally, and those at the ends of an open fire, for want of a full supply of air, with adequate heat, becomes united with pyroligneous and other vegetable acids, so as to form vegetable salts, and render the ashes unfit for soap-making. The vegetable acids being all combust-

ible, the value of such ashes can be entirely restored by *burning* them, that is, by placing them on a *hot open fire*, where there is a *free draft of air*; and this should be done every time before the ashes are put away for use. The ash-pit must not be of wood, but fire-proof, and must be dry, and kept *covered closely*, so as to exclude the air.

Next let me refer to churning. Few ordinary processes are less understood, even by the scientific, than that of churning; indeed it can hardly be said to be fairly known, whether the process is mechanical, or chemical, or both combined. During the process, there appears to be an enlargement of bulk of about one third, an absorption of oxygen from the air, and an elevation of temperature of about four degrees. A churn should never be filled more than about half full of cream, nor be so tight as wholly to exclude the air. From microscopic observation, the butter is believed to be inclosed in small sacks, upon breaking which, the inclosed butter is liberated. Hence the readiness with which butter frequently forms where the cream oozes through by the axle of the crank, the constant pressure breaking these cells, so as to liberate the butter. As previously remarked, different constituents of food, are differently employed in the animal economy; some parts are used for the formation of these cells or sacks, to which nitrogen is indispensable, others to filling these sacks with butter, to which carbon, hydrogen, and oxygen alone are necessary. Different kinds of food, as well as different treatment of the animal, will greatly modify, not only the amount of butter, but also the readiness with which it will be obtained from the cream. If the food have an excess of nitrogen, in proportion to the carbon, hydrogen, and oxygen, or if the cows are not kept sufficiently warm, but in order to keep up the necessary heat have to use the combustible matter of their food for that purpose, the sacks will be both *tough*, and not well filled, so that the butter will be "long in coming," and little of it, and poor and white when it does come. The remedy for this is to get your fathers and brothers, to keep the cows warm and well protected, and give them a sufficiency of oleaginous food, as corn meal, oil cake, or material of this kind, and you can have nearly or quite as good butter in winter as in summer, if the cows are equally fresh.

To clear coffee:—albumen, as the white of egg, is coagulated by heat, but is readily soluble in cold water, so that if even a very small quantity is dissolved in cold water, and the water gradually heated, the diffused albumen coagulates in every part, and as a fine gauze, passing up through the fluid, removes any gross particles it may contain. This is the principle upon which white of egg, or isinglass, is employed in clearing coffee. It is evident that it would be perfectly useless to add it to the *hot fluid*, as it would coagulate instantaneously, and could have no clarifying effect. The same principle applies to boiling meat. Meat is composed of *albumen*, which is, as just said, soluble in cold water, *gelatine*, which is soluble in hot water, and *fibrin*, which is not soluble at all. Now, keep in mind that it is not the *water* that cooks the meat in any instance; the water does not penetrate the meat or the food cooked by it, except it be to a very small extent indeed; it is the heat that cooks, and the water is used only as a means of applying that heat equally to the different parts of the article

to be cooked, and to prevent the temperature rising too high, inasmuch as the water can be made but little hotter than two hundred and twelve degrees, even when it contains salt, and is covered with oil. Hence, when it is desired to dissolve both the albumen and gelatine, as in making soup, the joint must be *well sliced*, and the water it is put in must be *cold* to dissolve the albumen, then heated till it boils to dissolve the gelatine and melt the fat. If the meat is put into hot water at first, the albumen will coagulate, and the soup be deprived of much of its richness. When the *meat* is to be used, and not the soup, the hotter the water when the meat is put in the better, so as to coagulate the albumen, and preserve the richness. The boiling point of water, two hundred and twelve degrees, is too high a temperature to cook some articles of food to perfection. It is too high a temperature, for instance, for boiling eggs. Do you know how to boil an egg? Like milk, an egg contains every element needed by the animal system, and in a more concentrated form than any other article of diet, and there is no more wholesome or nutritious food *when properly cooked*; but as often brought to the table, eggs are exceedingly indigestible, and scarcely fit to eat except by some robust laborer. Because of its being so nutritious and so slow of digestion, a person, as is well known, can fast longer on hard boiled eggs, than on any other kind of food. In what is often called a soft boiled egg, the white is perfectly coagulated by being too highly heated, and very indigestible, while the yolk is soft only because the heat has not penetrated that far, and is therefore not cooked at all. If the egg can be peeled without breaking, or if the white is coagulated so as to stick to the shell, it has been cooked at too high a heat. The proper way to cook them, is to pour *boiling* water into a vessel, (the quantity must depend on the number of eggs to be cooked, and is soon learned by experiment,) and then, after the eggs are placed in, cover the vessel tightly, and in about ten or fifteen minutes the eggs will be nicely and wholesomely cooked, and so that when they are broke, the contents will run into a cup without sticking to the shell. There is no danger of their cooking too much in this way.

Meat, as a ham, boiled at a temperature *below* that of boiling water, is considered, and no doubt is, more rich and juicy, as also more digestible, because the albumen is not so fully coagulated. Hence some epicures have hams boiled in *wine*, the effect of which is not, as many suppose, to impart to the meat the taste of wine, which it could not do as the wine does not penetrate the meat; but to cook it at a *lower temperature*, the wine boiling at a lower heat than water, of course prevents the meat from getting any hotter than the temperature at which it boils. Rare roast meat, as beef, if cooked, bears the same relation to that more done that a soft boiled egg does to one done hard, and is of course more digestible and wholesome.

Roasting, boiling, &c., should always be done by a *hot* fire, with good coals, so as partially to char the outer ends of the small vessels contained in the meat, and thereby retain the volatile and fluid juices, which would otherwise escape, and the meat will be much richer and better flavored. In cooking dough-nuts oil or lard is used, wholly, to regulate the temperature, this giving a sufficient degree before it boils (over 600°) to cook and

brown the dough, which is penetrated very partially, indeed, by the lard.

Now, young ladies, let us leave the kitchen, in which I fear I have detained you too long, and go into the flower garden. I am very fond of flowers, and I feel myself highly honored with the most beautiful bouquets you see here presented to me by some of your number, whom I take the present occasion heartily to thank. I admire flowers greatly and much favor their cultivation. I not only like *them*, but I estimate more highly *all young persons* whom I know to be fond of them. They are so refining, so pure, such fit emblems of youth and beauty, healthfulness and innocence, and may I not add, too, of prospective usefulness. There is much in them, also, to invite observation and reflection. The only point to which I shall at present have time to direct your attention, is the regular periods of the day at which many different varieties bloom and close. This fact was first remarked by Linnaeus, who proposed the Dial of Flowers or Floral Clock, by which the time of day could be known in the garden, by the condition of the flowers. How much more *poetical* and *Edenlike*, to make an appointment to meet a friend at the *blooming of the Morning Glory* or the *folding of the Hare Belle*, than to name a numerical hour of the clock. It gives rise, too, to such beautiful and instructive reflections as the following:

" 'Twas a lovely thought to mark the hours,
As they faded in light away,
By the opening and the folding flowers
That laugh in a summer's day.

Yet is not life, in its real flight,
Marked thus, even thus, on earth,
By the closing of one hope's delight
And another's gentle birth!

Oh, let us live, so that flower by flower,
Fading in light, may leave
One lingerer still for the sunset hour,
A charm for the shaded eve." F. HEMANS.

Now, I will leave the young ladies among the flowers, and accompany the young farmers on an excursion of observation to the fields. My great object is, in my present address, to invite my young friends to observation and reflection, being perfectly convinced they will thereby greatly add, not only to their intellectual improvement, but equally to their enjoyment. The first thing we shall notice is the chestnut trees. Were they now in bloom, I would draw your attention to the blossom, and show you that those furzy caterpillar-like looking pendants, that are frequently, if not generally, taken to be the blossom, are not such at all. These bear the same relation to the real blossom that the tassel of corn does to the silk on the ear. The true blossom has a glossy surface, without furze, and is generally surrounded more or less by the appendages just referred to. The same is true of the chinapin, walnut, &c. But the chestnut trees have burs on, which will now soon open. Have you ever studied the philosophy of the opening of chestnut burs? When affected by the hot sun or frost, so as to stop the sap from circulating, the watery part evaporates from the outside of the bur, causing it to shrink, and become too small to cover the nuts; whence it beautifully separates along the natural divisions, and, as it dries more and more, *warp*s wider and wider open, leaving the nuts temptingly exposed to view, or permitting

them to fall, upon an agitation of the limb by a breeze, or a club. When a *dry wind* succeeds a *frosty morning*, the burs, of course, open more rapidly. On the same principle, chincapins, shell-barks, &c., open.

Next let us examine the buckwheat, on which the grains are now just forming. We shall find that there is a great peculiarity in the development of the grain on this plant, the hull, beautifully folded, forms, of nearly full size, before any secretion of farina or meal takes place within it, and this hull performs the office of secreting the farina. We see, also, that the hulls form successively up the stalk, so that often they are in every stage, from the blossom to the full and ripe grain. When the buckwheat becomes affected by the sun or frost, so as to cause the circulation to cease, the grains can fill no further, and we will find them in every stage of fullness, down to the mere hull, or "light grains."

We now come to the cornfield, which affords one of the most interesting subjects of contemplation. By means of the agency of the vital principle residing in the germ or cell of a single grain, it in a few months appropriates to itself the inorganic elements in the earth, and in the air, to produce this wonderful structure, stalk and ear. [Here a stalk was exhibited.] This mysterious agent called the vital principle! What is it? That it is a power, as previously remarked, we have full evidence in the many tons of matter which a bushel of corn, for instance, is enabled by it to collect, and most firmly *weave* and *bind* together. Where was all the matter six months ago which now covers your forests with foliage, your cornfields with their luxuriant crops, fills your barns with hay, grain, and straw? It was *dead matter* in the earth and air, and has all been collected by this most wonderful, hidden, and mysterious power.

Its mystery is only equaled by its importance, because, on this principle, in the vegetable kingdom, all animal existence on the globe immediately depends for support. Man may analyze his food, and ascertain precisely all the elements of which it is composed, and the exact proportion in which they are combined, but his highest skill is unable to cause the elements to combine in these proportions, or produce from the whole what would sustain life for a single hour. Vegetables alone, by means of the vital principle with which they are endued, can effect this. They are the grand caterers for man, by a most mysterious agency, bringing the inorganic elements which cannot be assimilated at all by the animal system, into a condition in which the animal can appropriate them to its nourishment and growth. Some animals, as beasts of prey, cannot even assimilate *vegetable* bodies, but require that their food shall have undergone animal organization also, and would starve on vegetables. But still they are dependent on vegetables, since the animals they feed on are supported by them.

Again, it is the growth of the present year, principally, by which all are supported; so that if the earth were to cease to produce for a single year, and the food upon it were distributed so as to be partaken of by all animals as needed, *every one would necessarily perish*. We could not thus dispense with a single harvest; but for our consolation we have the abiding promise that, "while the earth remaineth, seed time and harvest shall

not cease." But what I am aiming at, is to induce you, in this connection, to view with greater interest the growing plants around you, and remember that as you increase the fertility of the earth, and consequently vegetable growth, you thereby increase the means of life and enjoyment.

To return to our stalk of corn. Examine its singular structure, and you will find that the cob grows from the stalk, and from every part of the cob where a grain is to set, a stran of silk puts out, and extends to the end of the ear, so that there are as many strans of silk, as the cob is designed to have grains. But there will no grain set at the origin of any stran of silk, unless the farina or pollen from that or some other stalk, falls on that silk. If the silk is removed before the pollen falls on it, no grain will set. When a stalk grows singly, it may have the appearance of a large ear on; but upon opening it, there will be but few grains, because, from the solitary tassel, few strans of silk received the pollen, and became impregnated, so as to mature the grain. This manifests the propriety of the present mode of planting corn in a body, so that the air becomes filled with pollen, some of which falls on every stran of silk. The size of the cob, and the number of rows, depend on the stalk. The size and character of the grain, on the tassel. This suggests a ready method of producing a *cross* of different varieties. If we wish, for instance, to set a large, deep grain, instead of a small one, on a large cob, plant the varieties in alternate rows, and then remove the tassels as they put out, from those rows that have the cob you desire to retain, the pollen from the other tassels will be sufficient to mature all, and thus will set the peculiar kind of grain on the cob of the other. But let us examine a little closer, and inquire into the *nature of that force* by which the particles of matter are thus taken from the earth and the atmosphere, and disposed to form the leaf, the stalk, the cob, and then, from each of these points on the cob, to arrange these gross particles into that beautiful and delicate silk, and extend them all out to the extremity of the ear. How is this performed with such undeviating precision and certainty? Again, if we take an egg of any bird, say a pea fowl, and expose it to a proper degree of warmth and moisture, either artificial or by means of the bird's body, for the bird sets on it only to keep it warm and moist, by this warmth the contained germ, or single cell, is developed, the particles of which the contents of the egg are composed, so arranging themselves in this development, as to form the delicate parts of the eye, the heart, the liver, the bones, &c., &c. Now, by what power is this effected? We call it the vital principle. But what is that? I desire to make you feel the importance of this inquiry. And then this young pea fowl is fed upon the corn, the development of which we have already examined, and it grows and puts out feathers, and the materials of this corn just gathered from the earth and air, are conducted along these extended feathers [here some long pea fowl feathers were exhibited] and arranged into these most beautiful, rainbow-colored, eyes at their extremities. These beautifully colored rings are composed of particles which were very recently in the earth, but which have undergone the double organization, first the vegetable, and then the animal. Undoubtedly the whole of this wonderful process cannot rationally

be ascribed to anything short of the *immediate action of Deity*. The poet Cowper, in the following quotation, forcibly argues to this conclusion:

"Some say that in the origin of things,
When all creation started into birth,
The infant elements received a law,
From which they swerved not since; that under force
Of that controlling ordinance they move,
And need not His *immediate* hand, who first
Prescribed their course, to regulate it now.
But *how could* matter occupy a charge,
Dull as it is, and satisfy a law
So vast in its demands, unless impelled
To ceaseless service by a ceaseless force,
And under pressure of some conscious cause?
He feeds the sacred fire
By which the mighty process is maintained,
Who sleeps not, is not weary; in whose sight
Slow circling ages are as transient days;
Whose work is without labor, whose designs
No flaw deforms, no difficulty thwarts,
And whose beneficence no charge exhausts."

The farmer having all these operations of the Creator continually before and around him, seems to live nearer to the Good Spirit.

Let us now return again to the buckwheat field. There we find the bee busily engaged in extracting honey. We follow him home, and observe his operations in building his cells in obedience to the law of instinct. Mysterious and unerring instinct, what is it? It is not education, for it is the same in all, and is perfect in early life, and even where an animal has been separated from all others of its species. It is not reason; it is not chance. It, too, is *Deity*, acting immediately upon *sentient* matter, with that unerring and unchangeable certainty by which gravitation is made to act by the same Almighty Being on dead matter. We call them laws of nature, but "nature is only the name for an effect whose cause is God." The same wise design by which the particles of the pea fowl's food are made to trace the long feather and assume that beautiful rainbow-colored "eye" at its extremity, forms the cell of the bee; and it is no more proper to speak of the ingenuity of the bee in the art of construction than of the pea fowl in the art of painting; both operations, and all similar ones, being *entirely and immediately* under the guidance and control of the one Great Universal Artist. Hence we see why

"Reasoning at every step he treads,
Man yet mistakes his way;
While *meaner* things, whom *instinct* leads,
Are rarely known to stray."—Cowper.

And, as far as they are guided by instinct, they never are.

Of all the subjects my mind has ever contemplated, and they have been numerous, those of the organic world, daily exposed to the view of the farmer, have greatly the precedence for interest and wonder, and witness most strongly the combined wisdom, goodness, and power of God. I have explored the field of astronomy to its furthest visible verge, have made myself familiar with its physical laws, and have reveled with delight in the immense regions of space, filled with mighty orbs, by which I was surrounded, and felt an impress of the *power* of Him who made them. But in the only light in which these bodies can be viewed they are *mere masses* of dead matter, subject in their movements to two forces, the pro-

jectile and central, the laws of which we feel we can readily comprehend; but the *laws of life*, and their influence in vegetable and animal development, out of the same few simple materials, forming such an infinite variety of productions, disposing the particles with such undeviating regularity to perform the most important functions, and holding them in their combinations by a power so strong, so hidden, so wonderful; these are *perfectly inscrutable and overwhelming*, the more so the more they are contemplated, and command the conclusion that in tracing them we have arrived at the last, the final link in the chain of sequences, and that this link resides in the Creator and Upholder of all things.

Ladies and gentlemen: I thank you for the kind attention with which you have listened to my remarks. I am sensible I have detained you too long, but must plead the same excuse for not being more brief that a gentleman once did who was asked why he did not make his discourse shorter, "I had not time." I have been for some time past quite indisposed, so much so that I was very apprehensive I should be unable to meet you on this interesting occasion. Although not fully recovered, I am glad I am here, and I only hope, after this long infliction, that *you* may be also. My object has been, however, in this discourse, not to waste the time of any of us, but to place before the minds of my hearers, particularly the younger part of my audience, subjects that will invite to thought and investigation, being so fully convinced of the increase of true and substantial enjoyment that thence arises. To reflect and study—not books, but the volume of nature, one or other page of which is continually open before you, inviting your perusal. Then, as nature's poet says, you will "find tongues in trees, books in the running brooks, sermons in stones, and good in *everything*."

How much yet remains to be discovered and known by even the wisest and most learned. The celebrated Newton, who it was conceded, occupied a higher position on the hill of science than any other man, remarked, near the close of his long life, on comparing the little he knew with the amount there was to be known, that "he felt like a child playing with a pebble on the shore, while the great *ocean of truth* lay unexplored before him."

All he knew he thought bore no more comparison to the vast unknown, than a pebble to the treasures and wonders of the mighty deep, a remark in which it is difficult to determine which is most distinguishable, his *wisdom* or his *humility*. One new discovery made and communicated, one spark struck out of the dark unknown, like a fresh germ out of chaos, may not only bear fruit itself, but, as the ear of corn, bear new germs, so as ultimately to multiply beyond all power of computation. The proper cultivation and improvement of our intellectual powers too, conduces to the improvement of our better and higher natures; for I can, with great sincerity, adopt the language of Junius, "grateful as I am to that Good Being, whose bounty has bestowed upon me this reasoning intellect, whatever it is, I feel myself proportionally indebted to him, from whose enlightened understanding another ray of knowledge communicates to mine. But, neither would I think the most exalted faculties of the human mind a gift

worthy of the Divinity, nor any assistance in the improvement of them a subject of gratitude to my fellow creatures, were I not satisfied, that really, to *inform the understanding, corrects and enlarges the heart.*"

APPENDIX.

As a brief and graphic little history of the interesting occasion on which the preceding discourse was delivered, the following communication to the National Intelligencer it is thought will not be inappropriate:

"THE FARMER'S MEETING IN MONTGOMERY.—The Society for the improvement of the County which embosoms the District of Columbia and the capital of the Union enjoyed a most gratifying scene on Thursday last. It generally happens that voluntary associations for patriotic objects gradually decay when the first impulse imparted by novelty begins to fail. 'Everybody's business, nobody's business,' is a paralyzing proverb. But the Montgomery Association has fortunately had two most zealous and intelligent presiding officers in Messrs. A. B. DAVIS and ROBERT P. DUNLOP.

"The result is seen in the resurrection of worn-out farms; in the rapid improvement of others which were before in some degree of preservation; in the introduction of new and more valuable stock of all sorts, and in the greater variety and excellence of agricultural products. But what gave more significant earnest than anything else of future progress and usefulness in the Montgomery Association was the great number of new subscribers who enlisted for the prosecution of the good work going forward. At no distant day it will environ the capital of our country with the most beautiful scene of cultivation anywhere to be found. The gently undulating surface of the county; the sparkling perennial streams with which it is intersected, affording water for every agricultural and manufacturing purpose; the delightful climate of the high-rolling region which, lifted up between the Eastern Branch, the Northwest, and Rock Creek, looks abroad to the Blue Ridge in Virginia and the mountains in Maryland; the healthfulness of every section; the fountains that burst up on almost every farm; the capability of every rood of land for remunerating cultivation, with the proximity of Washington, the best market in the world, form a combination of advantages which cannot fail, with the zeal and energy inspired and aided with the resources which commerce and science have added, to raise the neighborhood of our grow-

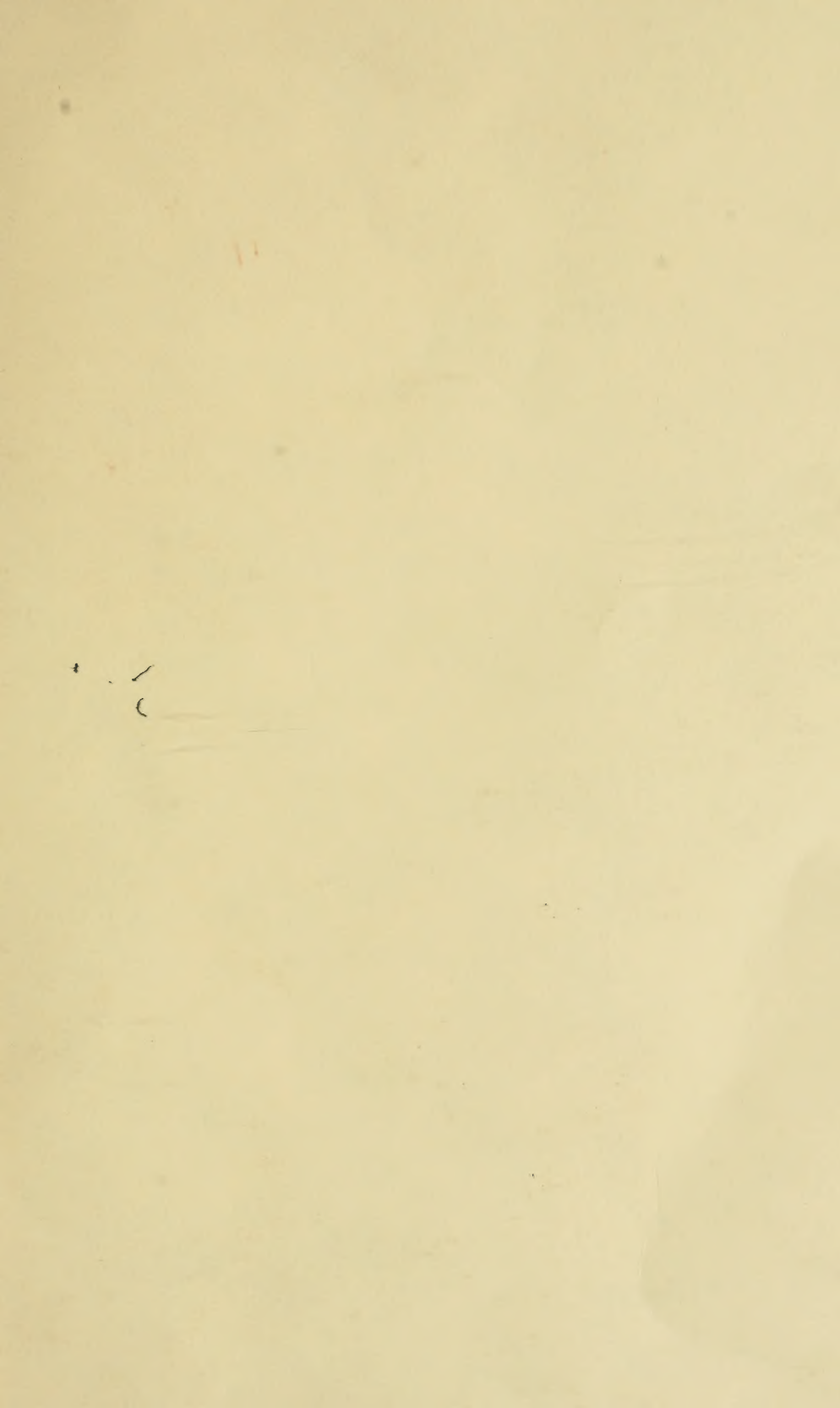
ing metropolis from its old state of desolation to a scene of exhilarating industry, productiveness, and beauty.

"Some of these topics were finely illustrated by Mr. HALLOWELL in his admirable address. It was the speech of a practical farmer, a scholar, and philosopher. Franklin himself could not have made a more enlightening and useful appeal to the understanding and interest of the community, or one better adapted to stimulate persevering industry in the best pursuit of life. Although the address was extempore, it was evidently well digested, and the President of the Society hopes that he may induce Mr. Hallowell to write it out for publication.

"One of the most agreeable circumstances was the full attendance of the ladies from every quarter of the county with every sort of domestic fabric that enriches our households. No one could have visited the pavilion, inscribed in letters of evergreen over the entrance, '*Household Gods and Household Goods*,' without a sense of its appropriateness. No man could have looked upon the beautiful forms and faces and the handiwork provided to make a happy home without being sensible that, apart from the religion of the soul, there is a devotion to the domestic virtues and to those who best personify them which may beget a kindred feeling.

"The quiet, peaceful, virtuous people of Montgomery, whose gentle demeanor and virtuous habits have given a good name to their county, are blessed in return in their homes, in their wives and daughters. The most remarkable of all the attendants of the exhibition at the grove near Rockville, was the grace and loveliness of the young beauties, who, mingling with the crowd of farmers, were all intent and gazing upon the stock and other agricultural products, unconscious that they were themselves 'the observed of all observers;' the objects for whose reception the earth was made a paradise, and for whose enjoyment every man should labor to restore it to its primitive beauty.

"The fine bright breezy day and the music of the full band from the city resounding through the grove; the speech of Mr. Hallowell so admirably suited to the occasion; the well-told reminiscences of Mr. Custis bringing up the olden time; the sociable pic-nics scattered here and there under the shades, all provided by the neighbors around, and to which friends and strangers from a distance were freely invited, made it altogether a true farmer's festival, forming a striking contrast in every particular with race-ground gatherings, electioneering assemblages, &c., where every extravagant passion runs riot."



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